

REMARKS

In the Office Action mailed April 8, 2003, the Examiner noted that claims 1-17 were pending, objected to claim 3 and rejected claims 1, 2 and 4-17. Claims 1-17 remain pending for reconsideration which is requested. The Examiner's rejections are traversed below.

Page 2 of the Office Action rejects claims 1, 2 and 4-17 under 35 U.S.C. § 103 over Spitz and Takaoka.

The present invention is directed to a system useful in portable devices, such as handheld scanners. The system scans a document for vertical or horizontal line orientation, extracts characters from the document and determines a rotation of the document based on the scan. This includes determining if the document is mirror image flipped. And, based on the information, the document is corrected to the proper orientation.

Spitz is directed to a system which determines skew and warp of lines of text in a document and corrects for the skew/warp. Spitz, as recognized by the Examiner, does not correct for mirror image flipping.

The Examiner alleges that Takaoka teaches this and points to Figure 12c and col. 10, lines 21-67 where it is alleged that "rotating the character image or by flipping the mirror image" is taught. Figure 12c is described in the text noted by the Examiner. To place the text noted by the Examiner in context, the noted text, supplemented through col. 11, line 28, should be considered. This noted and supplemented text specifically states:

The measure of similarity in the character recognition is thus obtained. The character alignment determination process based on the measure of similarity is now discussed. FIGS. 12A-12C illustrate the character alignment determination process, and in this example, a Japanese phrase {character pullout} (sales report of beers) is used.

FIG. 12A shows a string of characters of the phrase in a standard alignment. FIG. 12B shows the character strings rotated by 270.degree. from FIG. 12A. Now focusing on the character {character pullout}, it is subjected to the character recognition from four directions of 0.degree., 90.degree., 180.degree., and 270.degree. as shown in FIG. 12C. The angle of rotation is changed by modifying the manner of reading the feature vectors, and rotating the original document is not necessary.

The character recognition result is different from rotation angle to rotation angle as shown in FIG. 12C. FIG. 12C also lists the results of character recognition and their measures of similarity for illustration purposes only, and the actual system does not necessarily provide the same results.

In FIG. 12C, the character recognition is made at a standard direction (0.degree.), the character {character pullout} is correctly recognized with a high

measure of similarity of 0.90. When the character recognition is made at a direction 90.degree. shifted, the character is erroneously recognized as {character pullout} with a measure of similarity as low as 0.40. An erroneous recognition takes place with a measure of similarity lowered because the character recognition is performed based on the feature vectors in directions rotated. In the same manner, when the character recognition is performed at angles of rotation of 180.degree. and 270.degree., erroneous recognitions take place with measures of similarity lowered. The more complex the character, the greater the differences in the measure of similarity with the direction of the character recognition changed.

Since the measure of similarity is the highest at the standard direction in the results shown in FIG. 12C, it is highly likely that the original document is aligned in the standard direction. To increase the character alignment determination accuracy, a plurality of characters within the same text area are recognized from four directions in the same way as above. When the character alignment is determined in a single block only, a special character string may be picked up with an erroneous result. For this reason, a plurality of text blocks are subjected to the character recognition process.

The measures of similarity of the characters of interest are averaged in each of the four directions in the blocks, and the averages of the characters of interest in each of the four directions in text areas are averaged. The direction resulting in the highest final average is determined to be the alignment or orientation of characters (document).

Rather than determining the alignment based on the measure of similarity of a single character, the alignment of the character is determined referring to not only the measure of similarity of a plurality of characters within the same text area but also the measure of similarity of a plurality of characters within another text area. A high-accuracy orientation determination of the characters (document) is thus possible. The orientation determination is also possible by referring to the measures of similarity of a single character in a text area or the measures of similarity of a plurality of characters within the same text area.

In this way, the document orientation determination is performed. The characters within a document are varied in form. Some characters may be decorated initials. A drawing may be mistaken for a character. For this reason, the orientation determination process is preferably performed in more areas to result in a high-accuracy determination.

One example of the document orientation recognition has been discussed. Other recognition methods are also available. Any recognition method is acceptable.

Since the orientation determining block comprises a CPU having dedicated hardware, the processing system may be easily modified by instructions.

(Takaoka, col. 10, line 22-col. 11, line 28)

This text does not teach or suggest mirror image flipping of the document only determining the orientation by scanning from plural, specific angle directions. This orientation is used to edit the document by editing the document in a color reduction layout process associated with a photocopying machine. Takaoka is directed improving a reduction process in a photocopy machine.

It is submitted that the prior art does not teach or suggest automatically correcting an input document to a properly oriented document image when the document is scanned in an arbitrary direction by a handheld scanner when the scanning could result in a flipped mirror image. The present invention is capable of correctly orienting such an image. See figure 4(2) and other examples the invention can orient properly, such as figure 4(5) and 4(8). The Examiner is requested to note that a mirror image is: mirror image: something that has its parts reversely arranged in comparison with another similar thing or that is reversed with reference to an intervening axis or plane (see Merriam-Webster Online Dictionary copyright © 2002 by Merriam-Webster, Incorporated).

It is submitted that the prior art does not teach or suggest correcting the orientation of a document when the document is mirror image flipped as emphasized in the independent claims (1, 9, 14, 15, 16 and 17).

It is submitted that the invention of independent claims distinguishes over the prior art and withdrawal of the rejection is requested.

The Examiner has taken official notice that the features of claims 4 and 5 are allegedly notoriously well known. The Examiner is making this allegation based on his personal knowledge. The Examiner is requested to supply an affidavit supporting this assertion (see 37 CFR 1.104(d)(2)) or supply a reference teaching the features of these claims. Otherwise the Examiner is requested to withdraw this rejection based on personal knowledge.

The dependent claims depend from the above-discussed independent claims and are patentable over the prior art for the reasons discussed above. The dependent claims also recite additional features not taught or suggested by the prior art. It is submitted that the dependent claims are independently patentable over the prior art.

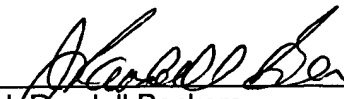
It is submitted that the claims are not taught, disclosed or suggested by the prior art. The claims are therefore in a condition suitable for allowance. An early Notice of Allowance is requested.

If any further fees, other than and except for the issue fee, are necessary with respect to this paper, the U.S.P.T.O. is requested to obtain the same from deposit account number 19-3935.

Respectfully submitted,

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Date: 8/7/3

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